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DOI:

[10.1080/17535069.2017.1293150](https://doi.org/10.1080/17535069.2017.1293150)

Document Version

Publisher's PDF, also known as Version of record

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Cowley, R., Joss, S., & Dayot, Y. (2017). The smart city and its publics: insights from across six UK cities. *Journal of Urban Research & Practice*, 1-25. <https://doi.org/10.1080/17535069.2017.1293150>

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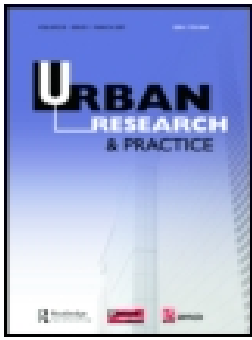
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To cite this article: Robert Cowley, Simon Joss & Youri Dayot (2017): The smart city and its publics: insights from across six UK cities, Urban Research & Practice, DOI: [10.1080/17535069.2017.1293150](https://doi.org/10.1080/17535069.2017.1293150)

To link to this article: <http://dx.doi.org/10.1080/17535069.2017.1293150>



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Published online: 07 Mar 2017.



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The smart city and its publics: insights from across six UK cities

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In response to policy-makers' increasing claims to prioritise 'people' in smart city development, we explore the publicness of emerging practices across six UK cities: Bristol, Glasgow, London, Manchester, Milton Keynes, and Peterborough. Local smart city programmes are analysed as techno-public assemblages invoking varied modalities of publicness. Our findings challenge the dystopian speculative critiques of the smart city, while nevertheless indicating the dominance of 'entrepreneurial' and 'service user' modes of the public. We highlight the risk of bifurcation within smart city assemblages, such that the 'civic' and 'political' roles of the public become siloed into less obdurate strands of programmatic activity.

Keywords: smart cities; future cities; UK; assemblage theory; public; publicness

1. Introduction

The growing body of academic commentary which the smart city has attracted in recent years (De Jong et al. 2015) has often suggested that its envisionment takes insufficient account of social and political questions (see e.g. Greenfield 2013; Söderström, Paasche, and Klauser 2014; Calzada and Cobo 2015; Hollands 2015). In parallel, the concept has met with less than universal approval in the broader public realm: in a review of popular cultural products, Vanolo (2016) has sketched out a series of 'smart city imaginaries', in which citizens are variously absent, excluded, or subjugated. But as smart concepts are gradually being translated into locally embedded policies and practices in many countries, the question arises of whether the earlier, speculative critiques of the smart city, and its rather dystopian popular imaginaries, remain relevant. The present research begins instead from the observation that contemporary policies appear consciously to have adopted an language of aspirational claims which chime with calls for smart cities to be more 'citizen focused' or 'people-centred' (Saunders and Baeck 2015). Whether these claims respond to its sceptical earlier reception or are the outcome of its accommodation within local policy processes, they suggest that the smart city has entered a new phase, as it takes shape in particular places, and about which we currently have relatively little empirical understanding (Kitchin 2015, 132).

The shift in smart city rhetoric is apparent in various recent national policies and initiatives. On its home page, the Indian Smart Cities Challenge website prominently claims that 'Good governance is putting people at the centre of the development process'

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(Smart Cities Challenge 2016). For Smart Nation Singapore, the hope is that ‘people are empowered by technology to lead meaningful and fulfilled lives. . . . A Smart Nation is built not by government, but by all of us’ (Smart Nation 2016). And the UK’s new smart city standards assert that ‘the key challenge around smart cities is not technological but about people’ (BSI 2015, 10) and that ‘For the citizen, the benefits of this integration of city systems include. . . an increased sense of democratic participation’ (7). Indeed, the present research focuses on the United Kingdom because ‘smart city’ discourse appears to be having a widespread influence on its local policy-making. A recent survey (Caprotti et al. 2016) found just under a third of UK local authority areas with populations of over 100,000 to have a clear smart city ambition and/or substantial-related initiatives taking place, and local programmes of activity are imbued with rhetoric implicitly countering the charge of the smart city being a technocratic imposition. Glasgow, for example, is ‘putting people at the heart of its future’ and ‘involving and empowering communities’ (Future City Glasgow 2016a); Manchester’s Smarter City Programme aims ‘to achieve better outcomes for the city and its citizens’ (Manchester City Council 2016); the Smart London Plan places ‘Londoners at the core’ (GLA 2016); Bristol’s vision of an ‘Open Programmable City’ involves ‘giving citizens more ability to interact, work, and play with their city’ (Bristol is Open 2016a).

The current phase in the (UK) smart city’s development, then, marks a confluence of earlier normative visions with the agency of local actors and agendas. In response to the common claims to be putting ‘the people’ or ‘citizens’ at the heart of the resulting activities, the present research explores the variegated ways that smart city programmes are attempting to mobilise ‘publicness’, conceptually, rhetorically, or practically. Based on the present study, we propose four modalities of publicness – which we label the ‘service-user’, ‘entrepreneurial’, ‘political’, and ‘civic’ – and understand these as emerging from particular ‘techno-public assemblages’ of issues, people, practices, and space. Through this framework, we explore two broad questions: *What types of publicness are envisaged and enacted through recent UK smart city policy initiatives?* and *What is the particular role of digital urban technology deployed through the smart city in shaping and recasting the public in novel ways?* In extension of the latter, we also open the following question to debate: *What spatial (re-)configurations of publicness are envisioned by and enacted through smart city policy?*

The article begins by introducing the concept of the techno-public assemblage, as a framework for analysing the smart city as it transitions from policy into practice. After then explaining the rationale for the choice of the six UK cities, and the approach taken to analysis, the article explores the characteristics of their smart city activities from the perspective of each modality of publicness in turn. This analysis draws out broad patterns in the relative prevalence of each modality across the six cities and the forms of the assemblage through which each emerges. Based on this evidence, the article then draws a series of conclusions about current successes and failures in developing a more ‘public’ smart city and possible reasons for these.

2. The smart city as techno-public assemblage

Like other grand urban visions, smart city concepts have to ‘negotiate with the spatiality and the geography of place’ (Harvey 2000, 179–180) as they are translated into individual political, economic, and social contexts. As a globally ‘mobile’, though ill-defined, body of urban policy (Crivello 2015), the smart city is likely to

be selectively adopted and reworked as it becomes embedded in local governance networks and pre-existing strategic concerns (Peck and Theodore 2001, 2010; Prince 2010). These processes increasingly provide the opportunity to analyse smart cities as situated bodies of practices, into which human actors are differently enrolled. Rather than understanding the smart city as a given set of technologies whose promoters (problematically) assume certain deterministic effects on society, this article construes the smart city as contingently shaped both by local factors and by broader (policy) discourses. To develop a grounded understanding of the varying implications for the ‘public city’ when different technologies are labelled as smart, implemented by combinations of local actors in response to varied agendas, and enacted in particular ways in particular spaces, we propose that smart city initiatives may be usefully theorised as techno-public assemblages.

In understanding these contingent (and shifting) local manifestations as giving rise to various modalities of publicness, we take direct inspiration from Newman and Clarke’s (2009) notion of ‘assemblages of publicness’. These authors draw attention to ways that ‘people... policies, discourses, texts, technologies and techniques, sites or locations’ and ‘forms of power or authority’ (24) become articulated in particular cases. They highlight ‘the creative and dynamic ways in which actors seek out, interpret, and enrol ideas in new settings... in which ideas are received, translated, mediated, and adapted into the new practices’ (20). Accordingly, we analyse smart city assemblages as shaped by multiple inter-related agencies rather than as only imposed by state or corporate actors from ‘above’. We note, further, Kitchin’s (2014) recent elaboration of the idea of ‘socio-technical assemblages’ of big data, referring to smart city infrastructure among other things, which draws on attempts to capture the open-ended, multiple, relational, and dynamic qualities of urban phenomena through the lens of assemblage theory (e.g. Farias and Bender 2010; Farias 2011; McFarlane 2011a, 2011b). In relating particular activities to each other and to city-level strategies, we follow Buchanan (2015), nevertheless, in understanding assemblages as ‘purposeful... not simply a happenstance collocation of people, materials and actions, but the deliberate realisation of a distinctive plan’ (385). The smart techno-public assemblages presented in this paper, then, are neither fixed nor fully fluid, but rather ‘working arrangements’ (383) which both derive from multiple deliberate processes of formation and are subject to ongoing stabilising and destabilising influences.

Our notion of ‘publicness’ is aligned with the long-term shift away from theorising the public as a singular whole or as expressing the common good, towards thinking in terms of a ‘heterogeneous public’ (Young 1989), or the co-existence of multiple ‘publics’ (see, most notably, Fraser 1990), whether interpellated by different media (see e.g. Warner 2002) or emerging around issues (see e.g. Marres 2005). It also reflects Mahony’s (2013) observation that the policy goal of ‘public engagement’ is informed variously by quite different perspectives on the public. Alongside its modernist sense as a representable ‘real and pre-existing entity’ (352), the ‘public’ may be conceptualised as a normative democratic ideal or as an emergent phenomenon. From a different angle, Barnett (2014), relatedly, observes that ‘public values’ often describe ‘distributed whole fields of practices and relationships’ (8). We conceive of the publicness of the smart city, then, as variously invoked and performed through the place-specific articulation of different goals, technologies, material spaces, and institutional settings.

The idea that publicness is assembled through new digital urban technologies also allows us to explore the implications of the differentiated *obduracy* (Hommels 2005, 2010) of what results. Although the field of the smart city may be in flux, its related *infrastructural* innovations in particular are likely to become relatively fixed (Hommels 2010) – even if their significance changes over time, as they ‘come to be related to new entities and react to them’ (Ureta 2014, 245). We are therefore alert to the possibility that certain forms of assemblages may come to form ‘stabilised networks’ constituting ‘potential actant[s] in a subsequent phase of urban development’ (Bender 2010, 310). Equally, the resulting norms of publicness may become ‘sedimented’ (Newman and Clarke 2009) into more permanent *institutional processes*. Conversely, those elements of the assemblages which are more ephemeral and fragile – as Newman and Clarke (2009) characterise many assemblages of publicness – may seem less well placed to have ongoing influence on the production of urban space.

Assessing the likely obduracy of these varied assemblages also potentially allows analysis to encompass more ‘emergent’ forms of public counter-discourse. It is precisely the obduracy of both infrastructures and regulatory institutions (as ‘sedimented’ sites of norms) which, in the Dewey (1989) tradition, lead to frictions and frustrations in times of rapid technological change. This raises the important question of whether the smart city adequately accounts for the possibility of public non-compliance or resistance. Whether, that is, it envisions – or even serves to suppress – the political multiplicity of civil society in the ‘real’ city. Conceptualisations of civil society only as a ‘domain that needs to be constructed and tutored (by governments and international organisations)’ (Newman and Clarke 2009, 58) may problematically ignore its more unruly, but potentially constructive, role as ‘the organic condition of society that provides the springboard for economic and social development’ (58).

Here, the scope of Newman and Clarke’s discussion of publicness is extended in two ways. First, we focus more directly on the impact of *digital* technology on its assemblage; relatedly, Barns (2016) has recently called for further understanding of what ‘digital urban publics’ might comprise. Second, we wish to initiate a discussion about the distinctive *spatialities* of smart city initiatives. While citizenship theory tends not to focus on questions of space, this goal seems germane within an investigation of the variegated publicness potentially generated by smart city initiatives as interventions in real (and virtual) urban space.

To make sense of the variegated publicness thus invoked, we conceive of it displaying four distinct modalities: the service user, entrepreneurial, civic, and political – each of which are discussed in the main findings section of this article. This novel four-way conceptualisation was derived, on one hand, from political theory perspectives on the public, and in particular Newman & Clarke’s (2009) aforementioned theorisation of new heterogeneous forms of publicness, which not only distinguishes between political and civic publics, but also draws attention to the emergence of new uneven market- and consumer-based sites and practices of publicness. On the other, it was derived from a grounded analysis of contemporary smart city initiatives identified in an earlier broader survey of 34 UK cities (Caprotti et al. 2016). This empirical material highlighted the varied ways in which the public was explicitly or implicitly positioned in relation to smart city strategies and activities. Altogether, these theoretical and empirical observations resulted in the four distinct heuristic categories presented here. The categorisation was further corroborated by the growing literature which highlights the entrepreneurial aspects of smart city governance (e.g. Caragliu, Del Bo, and Nijkamp 2011; Wiig 2015; Evans, Karvonen, and Raven 2016; Krivý 2016) or

suggests that smart city visions of technology-driven innovation in service provision have not convincingly accounted for the social and political dimensions of urban life (see Introduction).

3. Methodology

This research focuses on evidence drawn from six UK cities: Bristol, Glasgow, London, Manchester, Milton Keynes, and Peterborough. The units of our comparative analysis are not these cities in a broader sense (Robinson 2011) – defined, for example, by municipal boundaries – but rather their smart city (policy) activity at the point of local implementation. Our choice does not imply that we advocate these cities as exemplars of ‘best practice’, but rather reflects in each case the emergence of a relatively wide range of activities through policy-making explicitly drawing on smart city discourse. We treat these cases as important ‘nodal points’ within wider flows of concepts and policy discourses (15) and have included six – rather than focusing on, say, one city in particular – in order to capture a sufficient diversity of institutional and municipal contexts through which local policies are being applied, precisely since we are interested in the variety evident among programmes of activities taking shape within different local contexts.

The six cities were selected following an earlier analysis (Caprotti et al. 2016) of relevant national policy documentation and internet searches on ‘smart city’ or ‘future city’¹ initiatives across the United Kingdom. The latter reflects the naming of the national Future Cities Catapult centre, established by the government to support the development and implementation of smart city technology. Additionally, all six submitted bids for funding in the 2012 *Future Cities Demonstrator* competition, held by the Technology Strategy Board, the national innovation agency supported by the Department for Business, Innovation and Skills (see Taylor Buck and While 2015; Caprotti et al. 2016); Glasgow, as overall winner, was awarded £24m to implement its plans, and Bristol, London, and Peterborough were each awarded £3m as runners-up. Since this competition significantly catalysed all six cities’ smart activities, we treat their submitted ‘Feasibility Studies’ as key policy documents. As a commonality, this competition also provides a basis for comparative research (Robinson 2011) exploring the variety of the ‘actually existing’ smart city (Shelton, Zook, and Wiig 2015) in the United Kingdom.

For each urban setting, the key policy strategies and all associated current and planned activities were identified, and relevant publicly available documents were collected. Specific activities were included if they were clearly linked to, or promoted within, the policy documentation, and sought either to use digital technology to achieve particular goals or to facilitate the use of digital technology. Beyond this, no further criteria (e.g. the centrality of ‘big data’) were imposed, given our desire to understand how the smart city has been assembled contingently in practice. Table 1 lists the 68 activities thus identified and the key associated policy documents, along with any overarching programmes of which particular activities formed a part, or local bodies (typically partnerships involving the council among other actors) responsible for their delivery.² The time frame for gathering this documentation was April–June 2016, and those materials publicly available during this period were included in the research.

Based on this set of documents, each of the 68 activities was then analysed individually. First, through a protocol with four inter-related assemblage dimensions based on Newman and Clarke’s (2009) discussion: (1) the issues which the activity or policy sought to address; (2) the key actors involved in implementation; (3) the particular socio-technical practices

Table 1. Summary of smart city policy documents and initiatives analysed in six UK cities.

Bristol			Glasgow			London (GLA)		
Key Policy Documents			Key Policy Documents			Key Policy Documents		
Smart City Bristol (2011)			Glasgow City Management System (2012) *			Linked London (2012) *		
Connect Bristol Feasibility Study (2012)*			Open Manifesto – Principles (2013)			Smart London Plan (2013)		
			City Technology Platform (2013)			The Future of Smart (2013)		
						Data for London: A City Strategy for London (2016)		
Programme/organisation			Programme/organisation			Programme/organisation		
City Council	Activities (year launched or took place)	Activities (year launched or took place)	Future City Glasgow	Open Glasgow (2013)	Open Glasgow (2013)	Linked London	Activities (year launched or took place)	Activities (year launched or took place)
	Gigabit Bristol (2012)			Glasgow Operation Centre (2013)			Smart Park/Queen Elizabeth Park (2014)	
Bristol Is Open	Data Dome (2015)			My Glasgow (2013)	My Glasgow (2013)	Smart London Board	London Datastore (2010)	
	IoT Mesh (2016)			Intelligent Street Lighting (2013)	Intelligent Street Lighting (2013)		Smart London Districts Network (2014)	
	Wireless Mile (2016)			Dashboards (2013)	Dashboards (2013)		Smart London Infrastructure Network (2015)	
	Software Defined Network Control (2016)			Active Travel (2013)	Active Travel (2013)		Talk London (2015)	
Connecting Bristol	Open Data Bristol (2010)			Hacking the Future (2013)	Hacking the Future (2013)		Civic Crowdfunding (2015)	
	Media Sandbox 2010 B-Open Strand (2010)			Community Mapping (2014)	Community Mapping (2014)		Infrastructure Mapping Application (2015)	
	Playable Cities Award (2013)			Future Makers (2014)	Future Makers (2014)		Tech Londoners: People Solving City Challenges (2016)	
	Democratree (2014)			Open Data Catalogue (2013)	Open Data Catalogue (2013)		Speed Volunteering (2016)	
	My Knowle West/My Bristol (2014)			Linked Mapping (2013)	Linked Mapping (2013)			
	YouDecide (2015)			Energy (2013)	Energy (2013)			
	Healthy Office (2016)			Social Transport (2013)	Social Transport (2013)			
	REPLICATE (2016)			Engaging the City (2013)	Engaging the City (2013)			
Knowle West Media Centre	Bristol Approach to Citizen Sensing (planned)			Citizen Engagement (2014)	Citizen Engagement (2014)			

Manchester	Milton Keynes	Peterborough
Key Policy Documents Digital Strategy (2008) Digital Manchester (2012) Manchester Future City (2012) * Smarter City Programme (2016)	Key Policy Documents Future-Ready MK (2012) * MK Smart: A Water strategy for Milton Keynes (2016)	Key Policy Documents Peterborough DNA (2012) * Delivering a truly smart city (2014)
Programme/organisation Manchester Digital Development Agency Corridor Manchester Smarter City Programme	Activities (year launched or took place) Manchester Living Lab (2006) Triangulum (2015) CityVerve (2016) Manchester Digital Laboratory (MadLab) (2009?) DIMMER (2013) MiGuide (2013) Central Library Digital Demonstrator (2014) Intelligent Lighting (2015) DataGM (2011)	Activities (year launched or took place) Brainwave Portal (2014) OpenCity Screen (planned) Hackathon (2014) Innovation Week (2014) Living Data Portal (2015)
Greater Manchester Data Synchronisation Programme	Programme/organisation MK:Smart MK Data Hub (2016) Our MK (2015) Garden Monitor (planned) Water Monitor (2016) Water measurement school kits (2014?) Smart Meters (2015) Apex Suite business engagement programme (2015) MK Hackathon (2016) Motion Map (2015) Smart Parking (2015) Open Energy Map (2016?) Electricity Demand Shifting (2013) Smart Grid Dynamic Demand Response (2014) Smart Lighting (2014?) Imagined Festival/Intelligent Mobility Hackathon (2016)	Programme/organisation Peterborough DNA Innovation Week (2014) Living Data Portal (2015)
	Transport Systems Catapult	

* Feasibility Study for 2012 Future Cities Demonstrator Competition

involved; and (4) the variegated spatiality produced. And second, to identify the dominant modality of publicness thus invoked: service user, entrepreneurial, political, or civic (as discussed in the previous section).

By taking into account the linkages between individual activities and the wider policy landscape, a profile of each smart city assemblage as a whole was built up. For the purposes of triangulation, the results were aggregated following separate initial analyses and jointly reviewed by the three authors. Finally, a transversal analysis was conducted across the six cities, in order to identify common patterns as well as divergent practices.

Basing the analysis on detailed evidence has allowed for some of the variety across particular locations to be captured, in partial response to Kitchin's (2015) call to move beyond critiques of the 'place-less' corporate and governmental promotional literature. Our response is a partial one since, given the emergent nature of much smart city activity even in these six locations, the research neither investigates practices of implementation in depth, nor provides a long-term perspective on the smart city's impact on the lived experience of the city. The aim, rather, has been to investigate the outcomes of the processes whereby the 'place-less' smart city has been translated into locally specific projects, through the lens of the documentation surrounding these.

The high-level findings reported below relate to our conclusions about the relative prominence of different modalities of publicness. Although the discussion is illustrated with particular examples of activity, space does not permit a thorough presentation of the detailed elements of the six assemblages.³ Any of these elements can itself be seen as a techno-public assemblage, and the analytical framework is offered as a tool for others wishing to explore the public dimensions of current and future smart city activities at a granular level.

4. Findings

4.1. *The smart city in six municipal contexts: initial findings and observations*

It is worth noting first that the policy documents analysed generally operate at the periphery of traditional urban planning frameworks: local authorities are not formally obliged to include smart city principles within statutory planning processes. Instead, these policies are often championed by overarching strategy boards, economic development agencies, and similar municipal bodies. As such, they typically seek to promote cohesive socio-economic innovation policy to a range of actors both internally and externally for the purpose of leveraging inward investment. Thus, they will have been shaped by their imagined reception by varied audiences (Freeman and Maybin 2011, 163–164), rather than by the specific intention that they should serve as traditional planning tools. The varying status of this documentation is significantly reflective of the often opportunistic nature of smart city activity, but also points to the often complicated governance arrangements in place. Importantly, then, the relationship between the policy documents and activities shown in Table 1 is not consistent across the six cities. For Glasgow, which presents itself as having relatively straightforward governance arrangements, there is clear linearity between the plans outlined in its 2012 Feasibility Study and the resulting initiatives. At the other end of the spectrum, Manchester's recent Smarter City Programme, for example, essentially collates a series of activities already planned or taking place.

The activities themselves range from small-scale pilot scheme to major infrastructural projects; from interventions into specific, spatially bounded areas to initiatives operating in virtual space city-wide; from 'top-down' technological innovations to grass-roots

community activities; and from one-off events to ongoing activities and services already well-embedded into the urban fabric. Despite the identification in the academic literature, then, of broad commonalities in variously conceived smart city ‘imaginaries’, its manifestations on the ground in the United Kingdom defy simple categorisation at first sight.

The policy documents also display noticeable city-specific inflections in their narrative framings, reflecting the local contextual factors through which the translation of smart city discourse into practical activity has been mediated. To provide some background for the main analysis, an overview of the key framing principles in each city’s policy documents is provided below, along with the varied governance structures that have emerged in dynamic relationship with both the policy documents and the activities themselves. Such differences – as will be discussed – help to explain some of the forms that local assemblages take, with implications in turn for the nature of the publicness invoked.

4.1.1. *Bristol*

Bristol’s stated overall smart city goals are to expand the city’s knowledge economy, in a way which furthers its image as a pioneer in environmental sustainability and a centre of grass-roots innovation. Its 2012 Feasibility Study (Bristol City Council 2012) broadened the remit of the earlier *Smart City Bristol* report (Bristol City Council 2011), which focused largely on carbon emissions and transport issues, to develop a narrative of enabling environmentally and socially sustainable growth at a time of economic expansion, in recognition of the city’s significant health and wealth inequalities.

The council is one actor among many in Bristol’s current smart city activities, which are not orchestrated by an overarching policy document. Nevertheless, the dual focus of its 2012 Feasibility Study, which proposed a mixture of ‘hard’ infrastructure and a parallel programme of citizen engagement, resembles the two-stranded nature of what has emerged in practice. The first strand, delivering digital infrastructure, is coordinated by the ‘Bristol is Open’ partnership between the council and the University of Bristol, with support from other private, public, and charitable organisations. The second collates various activities mostly related to citizen and SME engagement, within the ‘Connecting Bristol’ initiative. Here, the council’s role is more ‘hands-off’: specific activities are typically directly led by social enterprises such as the Knowle West Media Centre.

4.1.2. *Glasgow*

As the overall winner of the Future Cities Demonstrator competition in 2012, Glasgow was awarded £24m to implement its Feasibility Study proposals. Approximately half the award (Davies 2014) was spent on a smart Operations Centre, fully operational since 2014, which monitors real-time transport and public safety data. Meanwhile, a spread of smaller initiatives took place, many of which were participatory and interactive and were concluded (as project deliverables) by the end of the TSB grant period.

Glasgow City Council clearly positions itself as the key driving force behind these activities: the initiative is characterised by the absence of publicised collaborative partnership. This may reflect the terms of the TSB award, positioning the City Council as the single contractor and requiring rapid project implementation within the two-year schedule. Equally, it upholds the principle asserted in the Feasibility Study that ‘smart cities are led from the top by a strong and visionary champion’ (Glasgow City Council 2012, 5). Either way, the

council's centrality appears to have left Glasgow's official smart city activities in a state of suspension following the end of funding.

4.1.3. London

London's foray into smart city innovation is explicitly linked to the opportunities and challenges facing the UK's capital as a global city: the smart city discourse deployed forms an integral part of the overarching narrative of London striving for continuous growth and consolidating its position as a leading international city (Mayor of London 2013; see also NESTA 2015). The 'Smart London' initiative is primarily directed at forging a new collaborative and entrepreneurial mode of governance, in the service of sustaining economic growth to meet expected population growth. The Greater London Authority (GLA), and particularly the office of the Mayor of London, is positioned at the centre of a wide range of activities. It has co-opted a number of public and private actors, including leading researchers, tech companies, and larger utilities, mainly through the Smart London Board and individual project partnerships. In promoting a co-creative governance mode for smart city innovation, the GLA's role is more to 'steer' than to direct outcomes.

4.1.4. Manchester

Manchester is building on a legacy of digital innovations, having published digital strategies in 2008 and 2012, and previously established a Digital Development Agency (MDDA) in 2003 (which was disbanded in 2015). Its 2012 Feasibility Study framed its smart aspirations as potentially consolidating recent successes including strong hi-tech industries, infrastructural investments, and repopulation of the urban core. The 'Defining vision' of Manchester was presented as 'the birthplace of the industrial revolution re-inventing itself as a model of twenty-first century "green growth"' (Manchester City Council 2012, 8). The Feasibility Study was taken as a starting point for an ongoing programme of smart activities in the Oxford Road Corridor (Manchester City Council 2013), running 2 km south from the city centre. Corridor Manchester, established as an incorporated body in 2007 (CAICT and PDSF 2014, 131), hopes that the district will continue to attract 'knowledge workers' to become 'one of the top five innovation districts in Europe' (Corridor Manchester 2015, 4), achieving 'local and global recognition as a place that is original, creative, and smart, where knowledge is put to work' (4).

Its smart city activities exhibit a particularly networked style of governance, with the council just one of a series of actors allied in varying combinations – most noticeably, the city's universities and large hospitals, local engineering and hi-tech firms, Transport for Greater Manchester, and grass-roots digital organisation Future Everything. However, the council appears to have reclaimed a more central role through its 2016 'Smarter City' programme, which promotes activities from across the city.

4.1.5. Milton Keynes

Milton Keynes consciously draws on its history of innovative urban planning and technology deployment in stating the aim of becoming the UK's 'leading digital city' (Milton Keynes Council 2012, 10), with an 'unambiguous objective, backed with

integrated city planning, to reduce its carbon footprint with an energy-efficient high-tech knowledge' (3). Although its 2012 Feasibility Study did not win funding, it has since launched a 'Future City' programme, clearly framed by the goals of citizen co-creation and environmental improvements.

Although universities typically play prominent partnership roles in other UK smart city initiatives, Milton Keynes is unusual in that the Open University is the dominant actor. This may be one reason why the MK: Smart programme strongly emphasises citizen engagement as an end in itself, rather than – as is more the case in London and Peterborough – a source of entrepreneurial ideas.

4.1.6. Peterborough

The smart activities taking place under the 'Peterborough DNA' programme, finally, are clearly shaped by a green growth strategy. Peterborough aims to become the 'Sustainability Capital of the UK', and as such 'that "capital" will be exploited to the maximum to ensure that it delivers true economic prosperity and well-being, through job creation and the integration of employment, skills and innovation' (Peterborough City Council 2012, 4). The 'fundamental goal' of its smart activities is one of 'growth, innovation, and sustainability' (Peterborough City Council 2014, 4).

As a runner-up in the TSB competition, Peterborough was awarded £3m. While its more expensive proposals, including significant investment in the transport system, were not funded, the four strands of its 'DNA' programme are similar to those proposed in its 2012 Feasibility Study: 'smart business', 'living data', 'skills', and 'innovation'. In accordance with the strong economic focus of the programme, Peterborough DNA is led collaboratively by the council and the Local Economic Partnership 'Opportunity Peterborough'.

4.2. The four modalities of publicness and their associated forms of assemblage

Despite the variety suggested above, some pertinent observations can be made about both common tendencies and significant differences, in the types of publicness invoked by the various smart city initiatives across the six cities. As noted, we distinguish four modalities of publicness, each of which correlates broadly with particular forms of assemblage.

4.2.1. Service-user publicness

What we term the 'service user' modality of publicness relates the consumption of everyday urban services: when, for example, a person travels by public transport, consumes water or electricity, or uses broadband infrastructure. Smart technology offers the promise of potentially enhancing such public interactions with service providers, by providing more accurate or 'real-time' data for decision-making, new possibilities for users to contribute to services through automated or voluntary feedback, and new channels of accountability.

By our assessment, this modality was dominant in 25 of the 68 activities analysed, making it the most common form of publicness across the six cities as a whole. Examples of relevant activities include Milton Keynes' smart parking initiatives, the 'Intelligent Street Lighting' and 'Energy Efficiency Demonstrator' pilots in Glasgow, and Manchester's 'Triangulum' project, which aims to reduce energy use and improve local transport. Most typically, such initiatives are characterised by relatively direct local council involvement. The issues addressed vary, depending on the type of infrastructure in question, but transport

congestion, resource consumption, carbon emissions, and digital inclusion are repeatedly mentioned in the documentation. A commonality, then, is a normative framing in which the goal of improved *efficiency* is highlighted.

Service user-oriented smart city projects are most typically associated with two types of spatiality. The first relates to the traditional materiality of systems operating across the city: digital technology serves to improve the functional efficiency of these existing systems. While, then, the new technology may have clear spatial effects (e.g. in reworking traffic flows, or recalibrating energy distribution), the spatialised phenomena to be rendered more efficient are already present.

Crucially, this is the most passive of the four modalities identified. The public is positioned as part of the city's routine functionality, rather than assigned 'co-creational' agency. This, then, does not radically depart from the traditional relationship of the public to infrastructural services. Of course, the provision of improved services does not contradict a claim to being 'citizen-centric', or 'putting people first'; its conceptualisation neither denies nor acknowledges that publicness may be assembled otherwise.

4.2.2. *Entrepreneurial publicness*

If 'service user' publicness implies a relatively compliant, reactive collectivity, a more active 'entrepreneurial' sense of the public is conjured up in other activities which enrol citizens into co-creating and innovating in the smart arena. This resonates with findings elsewhere identifying a strong entrepreneurial governance mode at work in smart cities (e.g. Hollands 2015; Wiig 2015). The entrepreneurial modality relates less to the everyday functioning of the city and more to the expectation that residents will be involved in creating services and economic value. Rather than addressing particular thematic issues, it is framed by an unmet need to harness the economic and service-related possibilities afforded by new digital technologies and big data. We identified this modality as dominant for 19 of the 68 activities considered.

Examples of related initiatives include the 'hackathon' events in several cities; the 'Tech Londoners' initiative (aiming to bring 'Londoners' and entrepreneurs together to co-create digital solutions to predefined problems); Peterborough's 'Innovation Week' workshops and 'Brainwave Innovation Portal'; and Manchester's Digital Laboratory ('MadLab'), which encouraged local residents to find solutions to social problems through 'co-creative, human-centric and user-driven research, development and innovation' (Ruijsink and Smith 2016, 4). Bristol's 'IoT Mesh' scheme will 'open-up the test-bed to a wide range of Internet-of-Things (IoT) developers. In doing so, Bristol Is Open will enable companies to perfect their new technology solutions for everything from smart rubbish bins to connected streetlamps and a wide range of IoT sensors' (Bristol Is Open 2016b). The various 'open data' initiatives across the cities serve directly to allow members of the public to make connections between the datasets provided (and with their own data, if they wish). Public involvement in such activities is often explicitly incentivised by commercial possibilities, and no clear conceptual distinction is evident between the public sphere and the market. Glasgow's 'Open Data Catalogue', for example, promises to 'empower everybody (the public, voluntary, academic, private sectors, and communities) to harness [data], use it, and combine it in new ways. We can all contribute to making Glasgow a better place to live, work, and play' (Future City Glasgow 2016b).

In some cases, such as hackathon events, the practices associated with this entrepreneurialism take place in traditional fora or make fairly conventional uses of internet sites (as

in the case of Tech Londoners). But a more distinctively ‘smart’ spatiality may sometimes be observed in the various attempts to add a ‘digital layer’ to the city, creating what might be termed a *ubiquitous network of connectivity*. The digital infrastructure projects within the Bristol is Open programme exemplify this spatiality particularly well; in a literal sense, they will add a layer of digital connectivity to the city centre. The ‘Wireless Mile’, for example, aims at the creation of a ‘heterogeneous technology environment’ (Bristol is Open 2016c: 1) which integrates differently formatted wifi signals, such that ‘complex multi-layered networks of overlapping big and small cells supply smartphones, tablets, cars, drones and even buildings, with a huge amount of cheap connectivity’ (Bristol is Open 2016d:2). The various open data initiatives also fall into this category, insofar as they enable datasets about existing services and amenities to be linked together.

Again, this invocation of entrepreneurial public agency sits comfortably with claims that people are being put at the centre of smart city development: it explicitly invites public contributions to the ongoing forms that this will take. However, like the service-user modality, it says little about the more democratic dimensions of publicness. A more rounded sense of ‘citizenship’, as traditionally conceived, encompasses not only ‘social rights’ (i.e. access to services), but also ‘political rights’ (contributing to decision-making processes) and ‘civil’ ones (relating to freedom of speech) (Isin and Ruppert 2015). Accordingly, we further propose and distinguish between, a ‘political’ and a ‘civic’ modality of publicness.

4.2.3. Political publicness

We use the label ‘political’ here in the narrow sense of public involvement in decision-making and deliberation through institutional channels, or through novel extensions of these. Examples include the ‘Talk London’ online platform, which hosts a mixture of surveys, blogs, and discussion boards, promoting itself as a ‘place to discuss London’s big issues’ (Talk London 2016) and Bristol’s ‘Democratree’ app, which encouraged residents to nominate and vote on suitable locations for planting new trees. (While the latter was not initiated directly by the council, it nevertheless provided a direct means for residents to influence official decisions on resource allocation.) If there is a commonality in the issues addressed through such activities, it relates to a perceived lack of participation – often with certain social groups in mind – in local decision-making.

Overall, this is by far the least common modality of publicness invoked: it is dominant in only three of the 68 activities considered. This is perhaps surprising, given that the potential for digital technologies to reinvigorate democratic deliberation and decision-making has been enthusiastically envisioned and debated since the 1990s (Isin and Ruppert 2015). The lack of experimentation in this respect may partly be explained by the marginality of smart city activities to traditional policy-making processes.

The uses of online fora (as in the case of the Talk London initiative), or voting apps (Democratree), clearly depart from traditional modes of political deliberation – for example, face-to-face settings – and yet nevertheless describe rather conventional uses of the internet. However, there are too few examples in the set of activities analysed for us to draw conclusions about the types of spatialities or spatial effects associated with this modality of publicness.

We highlight the paucity of political publicness specifically because strategy documents make repeated claims that citizen engagement is vital to the successful implementation of the smart city and that related initiatives will enable wider citizen engagement with decision-making processes. Its absence points more to a situation in which the smart city not only

operates at the margins of normal institutional processes, but might even be critically interpreted as seeking to bypass them – a possibility raised by Shearmur (2016) in recounting how delegates at a technology conference imagined the public sector as merely an obstacle to smart city implementation.

4.2.4. Civic publicness

Decision-making mediated through official processes only captures part of a city's political life and may tend to frame issues in certain ways for the purposes of voting or other forms of deliberation. We therefore distinguish the 'political' from a rather less structured 'civic' modality of publicness, which loosely maps onto a traditional sense of the broader 'public sphere'. In other words, it inheres in those activities taking place in spaces beyond state institutions, but which are not directly oriented towards market activity. A local council's involvement in such activities is necessarily more at arm's length: it may enable or merely approve of such activities in its own promotional documents. The types of issues shaping its assemblage should, then, emerge 'from below'. Equally, however, this modality of publicness may be more immediately associated with leisure activities or 'playfulness' – such activities in public space may constitute a performative type of claim making within the broader democratic process (see e.g. Hou 2010; Parkinson 2012). The invocation of civic publicness is far from uncommon across the six cities considered here: on a par with the entrepreneurial, it is dominant for 21 of the 68 activities (and the most common modality in London).

Examples include the 'Community Wellness' strand of Manchester's 'CityVerve' project, aiming to encourage schoolchildren and commuters to take exercise in parks; Bristol's 'MyKW' community social media platform, the 'Bristol Approach to Citizen Sensing', and 'Playable City' initiatives; Glasgow's 'Active Travel' demonstrator initiative, insofar as it encouraged cyclists to share data and experiences of cycling in the city; and London's 'Speed Volunteering' app, which seeks to put those wishing to volunteer in touch with people seeking help.

We discern two distinctive spatialities as characteristic of assemblages of civic publicness. First, relevant initiatives are often constituted by the goal of *manifesting the virtual/digital in traditional (physical) public space*. Peterborough, for example, has planned a large 'OpenCity' digital screen in the city centre. Bristol's 'Playable Cities' competition has been running annually since 2013, to fund temporary artistic installations in the city centre. The project, also taking place elsewhere internationally, aims to put 'people and play at the heart of the future city ... Through interaction and creative installations, it unlocks a social dialogue, bringing the citizens into a city development conversation' (Watershed 2016). Examples have included the 2013 winner Hello Lamp Post, which allowed members of the public to have text message conversations with various items of street furniture; and Urbanimals in 2015, in which digitally projected animals would appear unexpectedly across the city and interact with the public (Watershed 2016). Manchester's 'CityVerve' Internet of Things demonstrator project, mentioned above, plans to install 'talkative bus stops', and a 'Community Wellness' sensor network in parks along school and commuter routes to encourage exercise (UK Government 2015).

The second characteristic spatiality of civic publicness relates to varied attempts to *reclaim the digital sphere from the private sector*. The idea of 'reclamation' may not be explicit in the documentation, but such initiatives are typically driven by civil society actors and aim variously to empower citizens to use and have a presence through new digital urban

technologies. Manchester's 'Living Lab' programme (whose current status is unclear, following the disbandment of the Manchester Digital Development Authority) included the development of an interactive local news and information web portal, featuring content created by residents. The 'Manchester Digital Laboratory' describes itself as a 'grassroots innovation organisation' (MadLab 2016a) which organises various events and digital training courses, with a core mission to allow the general public to 'help people to make things better, together', through 'experimentation', 'play' and 'fun', and the promotion of craftsmanship (MadLab 2016b). In Bristol, a local social networking site (first trialled as 'MyKW' in the Knowle West district) has been extended to the city as a whole (as 'MyBristol'). The planned 'Bristol Approach to Citizen Sensing' initiative, meanwhile, mentioned above, most explicitly displays the aim of reconfiguring virtual space in this way, in its vision of a 'co-created city commons' which 'supports the deployment of new or adapted technologies into everyday environments' (KWMC 2016, 1).

4.2.5. *Summary of relative prominence of different modalities of publicness*

Table 2 summarises the relative prominence of the four modalities of publicness, in each city and across all six cities.

Analysing these data too closely would potentially yield spurious findings, for several reasons: our six cities were not chosen to yield a somehow statistically representative sample of activities for the purposes of quantitative research; the coding of their modalities involved some subjective judgement; and all activities are equally weighted regardless of scale, time period, budget, and policy significance. These reservations aside, the findings provide an indicative overview of the variations in the publicness assembled in these six leading cities; and in this spirit, two broad observations are ventured.

First, the relative prominence of the four modalities differs considerably by city. In this sense, again, 'smart publicness', is evidently not determined by globally circulating discourses, but at least partly reflects its immediate governance and policy context. The relative absence of entrepreneurial publicness in Glasgow, for example, communicates the council's sole responsibility for delivering activities. In Bristol, the dominant entrepreneurial and civic modalities chime with an overall strategic goal of expanding the knowledge economy by tapping into a strong tradition of grass-roots innovation. The lack of service-user publicness in Peterborough reflects the limited funding available for hard infrastructural projects; the emphasis on entrepreneurial and civic publicness evinces the shared responsibility of the city's economic development agency and the council in managing the Peterborough DNA programme. London's relatively weak service use focus, differently, confirms the GLA's role as steering and advisory actor, rather than as funder of large-scale material interventions. The city-level assemblages in Manchester and Milton Keynes display similarity in their strong overall service-use sense of publicness and relatively weak civic modality. While civic publicness may come to the fore in Manchester in future, given Corridor Manchester's stated 'place-making' goals (Corridor Manchester 2015, 24–25), its current relative absence implies a lack of active engagement on the part of the general public. Milton Keynes is perhaps more surprising in this respect, given its clear strategic claim to be civically engaged. Its relatively weak civic publicness underlines the opportunistic nature of smart urban activities: those coming to be implemented or funded may reflect strategic goals unevenly; smart policy documents themselves carry relatively little weight in the urban development process.

Table 2. Relative prominence of dominant modalities of publicness in smart city activities across six UK cities.

Dominant modality	Bristol %	Glasgow %	London %	Manchester %	Milton Keynes %	Peterborough %	All activities %	Mean for 6 cities %
Service User	14	57	11	56	53	0	37	32
Entrepreneurial	36	7	33	33	24	60	28	32
Political	14	0	11	0	0	0	4	4
Civic	36	36	44	11	24	40	31	32
(Total no. of activities)	(14)	(14)	(9)	(9)	(17)	(5)	(68)	

Second, the proportion of initiatives oriented towards civic publicness is not insignificant: these account for approximately a third of all the activities examined. On this basis, it would be oversimplistic to dismiss the claims that the ‘actually existing’ contemporary UK smart city pays only lip service to the importance of public claim-making. Nevertheless, this embrace of the democratic process does not extend to the provision of significant opportunities for citizens to engage directly with the formal political system in innovative ways. In itself, the absence of envisaged political publicness does not undermine the possibility of more traditional public engagement with governmental institutions elsewhere; yet, the smart city does not provide channels for the direct expression of public contestation or more radical forms of dissent.

In this sense, the smart city may appear to be aligned with broader depoliticising or ‘post-political’ tendencies in governance generally and urban planning specifically (Swyngedouw 2007, 2011; Allmendinger and Haughton 2012; Joss 2015). In a post-political reading, its assemblage across UK cities would reflect the nature of its conceptual underpinnings: the smart city can only ‘command agreement as a result of [its] broadly progressive if non-specific framing’ (Allmendinger and Haughton 2012, 94) and is therefore ‘unable to arouse conflicts among political ideas’ (Crivello 2015, 919). Alternatively, following Newman and Clarke (2009), it illustrates the apparent paradox of the decline of the traditional ‘public’ being accompanied by its simultaneous proliferation as a fragmented multiplicity: political publicness may be assembling elsewhere, but is not associated with the intended role of the smart city in the United Kingdom.

4.2.6. *Obduracy*

Political publicness aside, our findings have at least provided convincing evidence that UK smart city initiatives are guided by a genuine desire to encourage civic engagement of various kinds. Even here, however, a more nuanced picture emerges when the relative obduracy of individual activities is factored in. Based on the available information, we flagged each of the 68 activities as either ‘permanent’ (to indicate ongoing operation or presence in the city) or ‘temporary’ (to indicate a one-off or time-limited activity). As Table 3 shows, civic (and political) activities tend to be less permanent in nature than those invoking entrepreneurial and service-user publicness.

In an important sense, the relatively temporary nature of activities oriented towards political and civic publicness is unsurprising, particularly when contrasted with the service-user modality, which is more often associated – as discussed above – with ‘hard’ infrastructural interventions. The consequences of such activities may be long-lasting, even when the activity itself is short-lived. Nevertheless, these findings fall short of convincingly heralding a situation in which citizenship is prioritised as the central ongoing concern of the UK smart city.

Table 3. Obduracy of smart city activities invoking each modality of publicness.

Dominant modality	Permanent %	Temporary %	Base (number of activities)
Service-user	76	24	(25)
Entrepreneurial	58	42	(19)
Political	33	67	(3)
Civic	48	52	(21)

Significantly, furthermore, a degree of *bifurcation* is evident in the overall techno-public assemblages, such that civic and political publicness are sidelined within less obdurate strands of programmatic activity. In Glasgow, the enduring legacy of the ‘Future City’ programme is most visible in the service-user-oriented Operation Centre. However, many of its other activities characterised by a more interactive and participatory mode of public engagement were one-off events. As ‘demonstrator projects’, they served in principle to help define, rather than enact, the smart city – but there is little evidence that this more temporary strand of the ‘Future City’ programme has subsequently been embedded in mainstream municipal activities. In Bristol, too, a clear bifurcation is evident. On one side, the ‘Bristol is Open’ improvements to the city’s digital infrastructure and the ‘Open Data Bristol’ initiative (all of which might be expected to be relatively durable) invoke primarily entrepreneurial publicness. On the other, the Connecting Bristol partnership promotes diverse ‘softer’ civic and political activities, led by grass-roots organisations, which exhibit rather less obduracy as small-scale pilot schemes or activities with limited public participation. Evidently, then, less commitment and resources are available for experiments in the field of citizenship, understood in more traditional liberal democratic ways, than in those which conjure up a passive or entrepreneurial public.

5. Discussion

Our reading of the smart city consciously departs from critical presentations of the smart city as a ‘top-down’ imposition, and towards a foregrounding, and more nuanced appreciation, of its practical variety. But the observation that this variety is skewed towards the assemblage of service-user and entrepreneurial senses of the public does not constitute a straightforwardly useful critique of its current local manifestations. The focus on service-user publicness, at least, is unsurprising to the extent that local authorities are arguably seen by default as primarily service providers. To observe that civic and political publicness, by way of contrast, are less well considered, and often only tokenistically accommodated, is not to make the normative case that these should necessarily, or could realistically, be privileged in local techno-public smart assemblages. Rather, the prevalence of this more passive modality of publicness becomes significant when set against rhetorical claims that the smart city is effecting transformational ‘citizen-centric’ change

The dominance of service-user publicness does little to counter a broader trend identified by Powell (2014, 15) towards ‘a shift in the notion of citizenship ... away from civic responsibilities and engagements, to classifying [citizens] as consumers who purchase services from providers’. Although Powell’s discussion relates to the role of digitised data more generally, it is clearly relevant to the smart city’s focus on providing greater efficiencies. Insofar as the ‘relationship between government individuals and corporate entities’ (15) is viewed through the lens of the ‘citizen as consumer’, its quality is only improved by the efficiencies which datafication enables. Citizenship, in this narrow sense, is not related to altruism or responsibilities, but rather based on a principle of *exchange*, and enacted through ‘collecting and sharing personal data’ (15). Drawing on Dean (2005), Powell highlights the risk that ‘the norms of publicity – information, communication, and participation – have come to stand for the political ends that they were presumed to serve’ (Powell 2014, 16). This perspective raises various questions about many of the goals of UK smart city initiatives in relation to the broader dimensions of citizenship. For example, the aim of ‘digital inclusion’, commonly asserted among these six cases, may appear laudable, and yet it pushes the deeper purpose of digital inclusion into the background: smart connectivity itself becomes the goal.

Similarly, ideals of ‘transparent governance’ or ‘open data’ may end up being fetishised within a discourse of efficiency, even though this discourse tells us little about the normative basis of the relationship between the public and the state, beyond its passive ‘service-user’ modality.

Although, again, our analysis opposes the existence of a deterministic link between global smart discourse and local practices, the focus on efficiency of different types (including resource use, provision of services, and access to information) clearly resonates with White’s (2016) identification of an international discursive storyline in which the smart city responds to ‘resource pressures brought on by rapid urbanization and an ageing population, the effects of anthropogenic global climate change, and the twinned pressure of fiscal austerity and inter-urban competition’ (577). We would at least suggest that the narrative of the ‘age of crisis’ which accompanies much of the contemporary envisionment of future cities (Caprotti 2015) has had a shaping influence on the prominence given to efficient service provision in smart activities implemented to date.

Equally, given the broader UK policy context, it would seem eccentric for local authorities to discourage entrepreneurialism. On the immediate pragmatic level of funding and resources, it must be significant that the government’s Department for Business, Skills, and Innovation has played a significant catalytic role: smart city initiatives have not emerged under the auspices of, say, the Department for Communities and Local Government. But the prominence of entrepreneurial publicness raises a separate set of concerns, echoing Datta’s (2015) diagnosis – albeit with reference to the rather different context of the Indian city of Dholera – of the smart city promoting ‘urbanization as a business model rather than a model of social justice’. Across our UK cases, issues of social sustainability are far from absent in policy documents, but their range tends to be limited, for example, focusing on health and e-inclusion, or educating residents to participate in the digital economy. In Glasgow, such questions are subsumed within overall questions of efficiency and relate to very specific factors such as public safety and reporting problems with services. Milton Keynes claims considerable interest in citizen co-creation, but its initiatives are not primarily aimed at targeting social problems. Although Peterborough’s 2012 Feasibility Study prominently flagged up inequalities, social cohesion, and health improvements among other issues (Peterborough City Council 2012, 3), its current strategy is addressed towards developing skills which ‘meet local business demand’ and ‘put Peterborough’ in ‘the best possible position to take advantage of emerging markets’ (Peterborough City Council 2014, 5).

One final way in which the ‘citizen-centric’ nature of the UK smart city is questionable relates to an apparent straightforward lack of public interest. On one level, this simply reminds us of the peripherality of the smart city: many of the associated activities only claim to be small-scale experimental trials and are not deeply embedded into the mainstream policy process. While the actual numbers of local residents involved with many civic and political schemes are often negligible, we found no convincing evidence either of broader enthusiasm or emergent public counter-discourse in any city.⁴ While emergent political or civic contestation is clearly not something which local authorities might ‘plan’ for – it would be absurd to expect local authorities to devise problems for frustrated publics to assemble around – its absence does not provide evidence of acquiescence or approval, or guarantee the smooth passage of smart technology into urban life more broadly in future. It more obviously reflects the survey evidence suggesting that general public awareness of any ‘smart’ plans or activities undertaken by local councils is negligible (Arqiva 2015) and that only one in five UK adults even recognises the term smart city (IET 2016).

6. Conclusions: towards a new ‘smart urban publicness’?

In studying and comparing a series of relatively well-developed smart city programmes as ‘techno-public assemblages’, we have responded to a series of policy claims made about the relationships between smart urban technologies and the public. Our analysis reveals that the publicness envisaged and enacted in the UK smart city is far from one-dimensional. Citizens are not merely absent, as the earlier critiques of the smart city would have it, nor do smart city activities necessarily invoke a particular, stunted notion of publicness in all cases. Rather, the great variety of types of publicness in evidence leads us to conclude that the rhetorical claims about the smart city being citizen-centric are not straightforwardly empty ones. Rather than agreeing with the speculative critiques of the smart city as a devious attempt to exclude the public, we would urge commentators to begin from the assumption that its institutional protagonists do have a vested interest in questions of democracy.

That said, it also seems fair to conclude that the smart does not yet evince a convincingly rounded sense of the ‘public city’. The opportunistic nature of smart city development, in other words, gives rise to unique local forms, but simultaneously holds these hostage to broader societal and economic agendas; the forms of their assemblage have remained shaped by immediate policy contexts and broader smart city policy discourse. Thinking in terms of its experimental, shifting and peripheral assemblage in practice nevertheless opens up agentive space for actors involved to influence smart development in ways which more convincingly invoke a more rounded sense of publicness and, in turn, enable a more convincing sense of public ownership and enthusiasm.

For more fully public smart city assemblages to emerge in future, the civic and political may need to be more obviously accommodated within the service-user and entrepreneurial. This need not relate to heavy-handed attempts to co-opt the civic, which risk neutralising its innovative potential, but the civic should at least not be siloed into more ephemeral strands of activity. A lack of civic engagement with large infrastructural projects, for example, seems unlikely to be successfully mitigated by a series of parallel participatory events which pass unnoticed by most residents. Similarly, entrepreneurial activities are to be welcomed which are more obviously oriented towards finding solutions to problems defined by citizens, alongside those oriented at the creation of wealth through hi-tech innovations. The possibilities for smart city technology to enable or engender more formal political participation, furthermore, appear to have remained largely unexplored in practical terms.

If only because the ‘actually existing’ smart city is still at an experimental stage of development, we note that it has effected only marginal reconfigurations of the material spaces of the city to date. Nevertheless, looking forward, we urge researchers and practitioners to pay attention to the distinctive spatialities of the ‘smart public’, particularly in the interfaces between public and private space, and between virtual space and the traditional material public realm. There is considerable scope in this regard to reverse the tendency, identified by Kinsley (2013), to assign the digital to a parallel, disembodied ‘hyperspace’; rather, our understandings might more fruitfully be grounded in the relationships between humans and technology in local contexts. For policy-makers and practitioners actively seeking a more widespread and involved sense of public debate around, and engagement with, the implications of smart technology, it may be rewarding to focus on the *visibility* of new innovations. This may involve moving towards a more active consideration of the multiple roles of public space and more imaginatively using smart technologies to move away from more traditional fora as spaces of public engagement.

Overall, we resist from concluding that contemporary UK smart initiatives already constitute a qualitatively novel recasting of the public. In relying on dominant political

structures and economic actors, they have come to promote incremental change at best, both in terms of publicness and the material space of the city. But assessing the long-term impacts of smart innovations on urban space will be an ongoing project; indeed, the concept ‘smart’ itself may in future lose currency as a label or be reworked as a signifier. In the meantime, insofar as the smart city is indicative of broader contemporary attempts to shape urban change in a time of austerity, its ‘experimental’ nature may appear rather more problematically reflective of a bypassing of the traditional democratic process. And if we too may be allowed to propose a dystopian scenario, it is one where, in spite of the best intentions of policy-makers, the dominant norms of emerging smart city practices become sedimented into novel twenty-first century institutional processes whose pragmatic world-view does not extend beyond that of a society of entrepreneurs and service users.

Acknowledgements

This study was undertaken at the University of Westminster with financial support from ESRC grant ES/L015978/1. Youri Dayot was Visiting Fellow from the University of Grenoble.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This study was undertaken at the University of Westminster, as part of the ESRC-funded project ‘Smart Eco-cities for a Green Economy: a Comparative Study of Europe and China’ (grant ES/L015978/1).

Notes

1. The two terms (‘smart city’, ‘future city’) are complementary and often used interchangeably, especially in the UK national policy context (see e.g. BSI 2014, 3; also; Joss, Cook, and Dayot, *forthcoming*). It is beyond the scope of this paper to delve into the conceptual interrelationship of these recent policy terms in more detail.
2. A fuller list of the key documents and links to relevant web pages consulted has been made publicly available on the lead author’s ResearchGate web pages: https://www.researchgate.net/profile/Robert_Cowley.
3. More detailed descriptions of many of the individual activities and bodies analysed in the present research may be found in the ‘grey literature’ (see e.g. Caprotti et al. 2016; Woods et al. 2016).
4. With the exception of some concerns in Glasgow about the use of facial recognition software in the city’s CCTV system, linked to the Operation Centre (*Sunday Herald* 2014; Aitchinson 2015).

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